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Canada–B.C.
Conservation and Renewable Energy Demonstrations

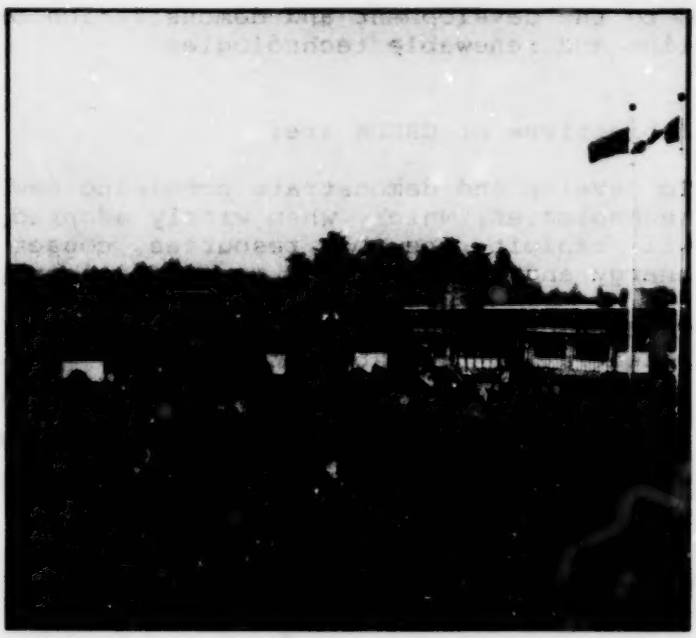
Energy, Mines and Resources Canada
Conservation and Renewable Energy Branch

Energie, Mines et Ressources Canada
Bureau de la conservation et des énergies renouvelable

Province of British Columbia

Ministry of Energy, Mines and Petroleum Resources
CONSERVATION AND TECHNOLOGY DIVISION

SOLAR HEATING AT UNIVERSITY OF VICTORIA'S MCKINNON BUILDING



CANADA-BRITISH COLUMBIA CONSERVATION AND RENEWABLE ENERGY DEMONSTRATION AGREEMENT

CANADA/BRITISH COLUMBIA CONSERVATION AND RENEWABLE ENERGY DEMONSTRATION AGREEMENT

The availability of secure and affordable energy supplies is a subject of national concern. It is an accepted fact that our primary energy sources - oil and natural gas - are becoming less accessible and more costly. However, Canada is well-endowed with non-renewable and alternative resources that can provide a bridge into the future.

To this end, the governments of British Columbia and Canada have entered into a Conservation and Renewable Energy Demonstration Agreement. The Agreement is dedicated to the development and demonstration of conservation and renewable technologies.

The objectives of CREDA are:

- To develop and demonstrate promising new technologies, which, when widely adopted, will exploit renewable resources, conserve energy and/or use energy more efficiently.
- To develop broad public awareness of the potential of renewable energy and conservation technology.
- To provide opportunities for the commercial application of the technologies within B.C.
- To create economic spin-off benefits for manufacturing, industry and commerce.
- To create employment in new or existing energy-related industries.

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SUMMARY

A large solar installation, including 4,200 square feet of collectors, was installed in February 1982 at the McKinnon Building, an athletics facility at the University of Victoria. The performance of the system was monitored, using Rho Sigma BTU meters, pyranometer, kilowatt-hour meter and thermometers, and the first year's results are presented here.

The system heats water for the showers, change rooms and indoor swimming pool. The installation is a Solarsystems Industries drain-down type, using single glazed collectors with selective coated absorbers. No solar storage is included in the design because of the uniform usage of hot water.

The technical performance of the system over the first year was outstanding, supplying 32.1% of the McKinnon Building's hot water energy needs. The contribution of 731.3 million BTUs resulted in a saving of 5,420 gallons of fuel oil. The installation saved 2.86 GJ of oil per square metre of collector area.

Although the system was not economical, saving $5,975 in the first year as compared to its capital cost of approximately $250,000, it effectively demonstrated that solar energy can displace fuel oil in this application. The demonstration was a major contribution to the advancement of solar technology.

INTRODUCTION

The McKinnon Building is the main athletics facilities complex at University of Victoria. A solar heating system, partially funded by the Canada/B.C. Conservation and Renewable Energy Demonstration Agreement (CREDA), was installed at the building for heating water for the showers, change rooms and indoor swimming pool. The system design engineers were Reid, Crowther and Partners Ltd. of North Vancouver, and the general contractor for the installation was Canem Systems Ltd. of Victoria. Installation of the system, which included 4,200 square feet of collectors, was completed in February 1982. Monitoring of the system's performance started in May 1982 and is still proceeding.

The total cost of the project, including feasibility study, monitoring and information transfer, was $284,255. The CREDA program provided $140,000 and the University of Victoria provided the remaining $144,255.

This report describes the design and installation of the solar system and its performance for the first year of operation.

SYSTEM DESIGN

The consumption of domestic hot water in the building is approximately 13,000 gallons per day. The water is used primarily for showers which receive heavy use throughout the day, nearly every day of the year. By replacing the 3 gpm shower heads with 2 gpm heads, the water usage could be reduced. The hot water supply temperature is 125°F; the mains temperature is assumed to average 50°F.

The pool water is maintained at 80°F and the pool air at 82°F. Based upon 50% relative humidity, the evaporative loss from the pool is estimated to be 0.4 gallons per minute. This being a small proportion of the domestic hot water load, the solar system design was therefore based primarily on domestic water heating. Pool heating would be secondary and would occur only when domestic water consumption was low.

The f-CHART computer simulation program was used to estimate the performance capabilities of several alternative solar system designs. The computer analysis was based on reduced domestic hot water consumption of 8,000 gallons per day, assuming replacement of the present 3 gpm shower heads with 2 gpm heads. The energy savings resulting from the reduced hot water usage would recover the cost of the low flow heads in less than one year.

The f-CHART program was developed for residential applications. Since the usage of hot water in the McKinnon Building is much more uniform than for residences, it was expected that the installation would provide more energy than predicted by f-CHART.

Three types of collectors were considered:

- inexpensive, low efficiency plastic swimming pool type;
- single glazed collector with painted (non-selective) absorber surface;
- single glazed with selective coating on absorber surface.

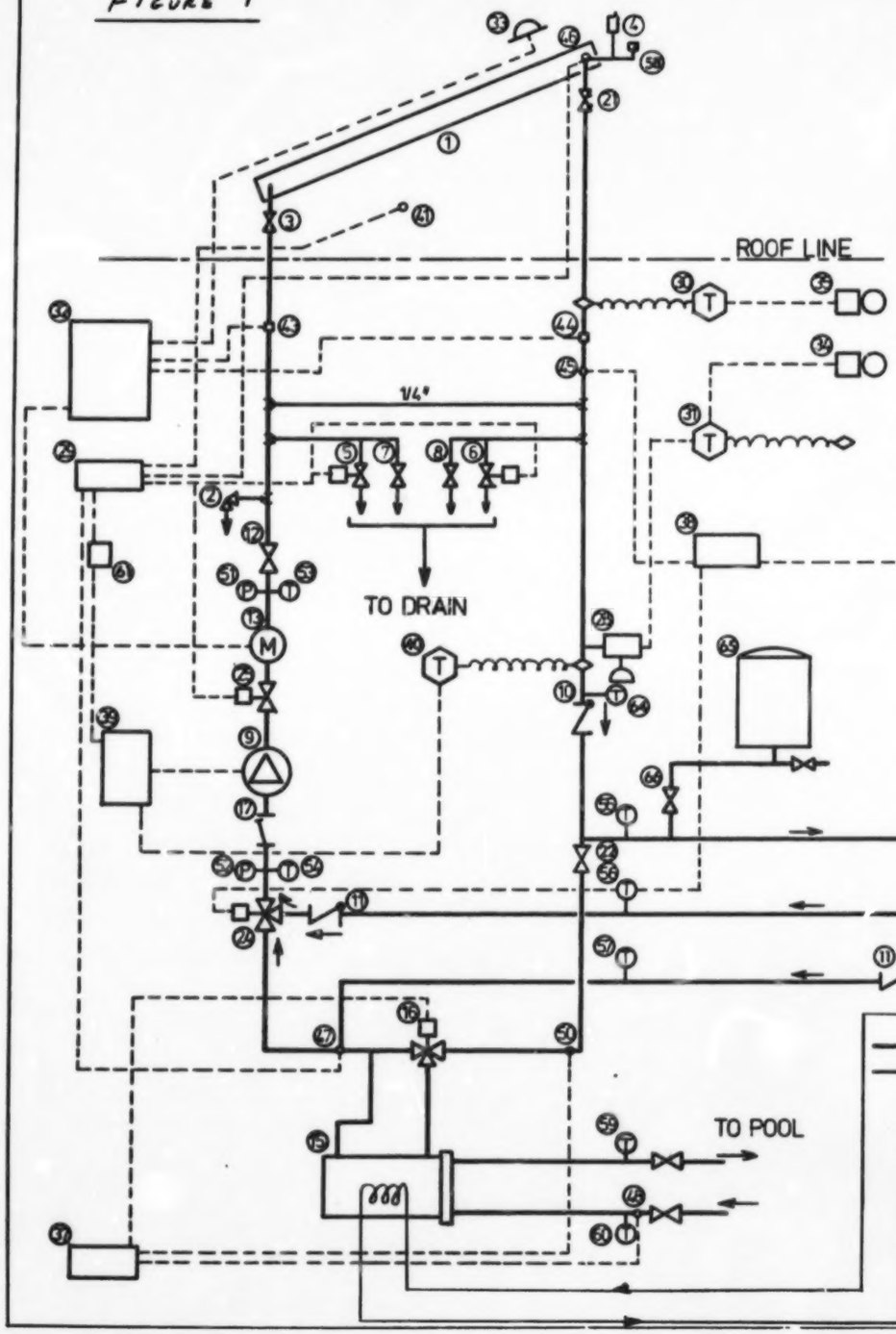
The analysis also considered a range of collector areas and tilt angles. The computer printouts are shown in the Appendix.

Cost/benefit analysis was done on the alternative system designs. The f-CHART and cost/benefit analyses indicated that the optimum design was 4,000 square feet of selective coated, single glazed collector. The design selected was a Solarsystems Industries drain-down system with 4,200 square feet (gross) of collectors oriented south at tilt angle of 22.5°. No solar storage was included in the design (see Figures 1 and 2) because of the uniform schedule of hot water usage.

The optimum collector angle would have been about 45°, but the analysis showed little loss of performance for a 22.5° angle. The 22.5° angle was selected for aesthetic reasons and slightly lower structural costs.

Examination of the roof construction revealed that neither the roof of the swimming pool nor that of the gymnasium was suitable to support solar collectors. However, the roof of the adjacent office wing was of reinforced concrete, and analysis showed that it was capable of supporting the collector arrays.

FIGURE 1



EQUIPMENT SCHEDULE

1. SOLAR COLLECTORS
2. PRESSURE RELIEF VALVE - 100 psi
3. ISOLATING VALVE - COLLECTOR ARRAY▲
4. AUTOMATIC AIR VENT▲
5. DRAINDOWN VALVE - COLLECTOR SUPPLY
6. DRAINDOWN VALVE - COLLECTOR RETURN
7. MANUAL DRAINDOWN VALVE
8. MANUAL DRAINDOWN VALVE
9. SOLAR PUMP
10. CHECK VALVE
11. CHECK VALVE
12. GATE VALVE - COLLECTOR LOOP
13. FLOW METER
14. GATE VALVE - RECIRCULATION LINE
15. POOL HEAT EXCHANGER
16. THREE-WAY CONTROL VALVE - POOL HEATING
17. STRAINER
18. DHW CIRCULATING PUMP (EXISTING)
19. DHW TANKS (EXISTING)
20. THREE-WAY MIXING VALVE (EXISTING)
21. FLOW MEASURING BALANCING VALVE▲
22. GATE VALVE - COLLECTOR LOOP
23. TEMPERING VALVE
24. THREE-WAY MIXING VALVE - RECIRCULATION
25. SHUTOFF VALVE COLLECTOR LOOP
26. GATE VALVE - WARM LINE
27. GATE VALVE - NORMALLY CLOSED
28. PRESSURE SWITCH
29. DIFFERENTIAL THERMOSTAT DT 16H
30. THERMOSTAT, REMOTE BULB @ 5°C
31. THERMOSTAT, REMOTE BULB @ 3°C
32. BTU METER
33. PYRONOMETER
34. ALARM BELL, OUTSIDE AIR TEMP.
35. ALARM BELL, COLLECTOR RETURN TEMP.
36. GATE VALVE - COLD LINE
37. DIFFERENTIAL THERMOSTAT DT 32H
38. DIFFERENTIAL THERMOSTAT DT 31H
39. MOTOR STARTER
40. THERMOSTAT, REMOTE BULB - HIGH TEMP PROTECTION
41. DT SENSOR - OUTSIDE AIR
42. TEMPERING VALVE
43. BTU SENSOR - COLLECTOR SUPPLY
44. BTU SENSOR - COLLECTOR RETURN
45. DT SENSOR - HOT DHW TRANSFER
46. DT SENSOR - COLLECTOR ARRAY TEMPERATURE
47. DT SENSOR - COLD, SOLAR LOOP
48. DT SENSOR - COLD, POOL
49. DT SENSOR - COLD, TRANSFER
50. DT SENSOR - HOT, POOL
51. PRESSURE GAUGE - COLLECTOR LOOP
52. PRESSURE GAUGE - PUMP SUCTION
53. THERMOMETER - SOLAR LOOP SUPPLY
54. THERMOMETER - SOLAR LOOP SUPPLY
55. THERMOMETER - SOLAR LOOP TO BUILDING
56. THERMOMETER-RECIRCULATION TO SOLAR LOOP
57. THERMOMETER - COLD TO SOLAR LOOP
58.
59.
60.
61.
62. ELECTRICAL RELAY
63. ELECTRICAL RELAY
64. THERMOMETER - SOLAR LOOP RETURN
65. EXPANSION TANK
66. SHUTOFF VALVE - EXPANSION TANK

▲ ONE PER BANK

Marked up by Trevor Jones, NEMPR

Rev	BY	D	M	Y

AP?

Solarsystems Industries Ltd.
11771 HORSESHOE WAY, RICHMOND, B.C. 271-2621

SOLAR HEATING, MCKINNON BUILDING, UNIVERSITY OF VICTORIA–FLOW SHEET.

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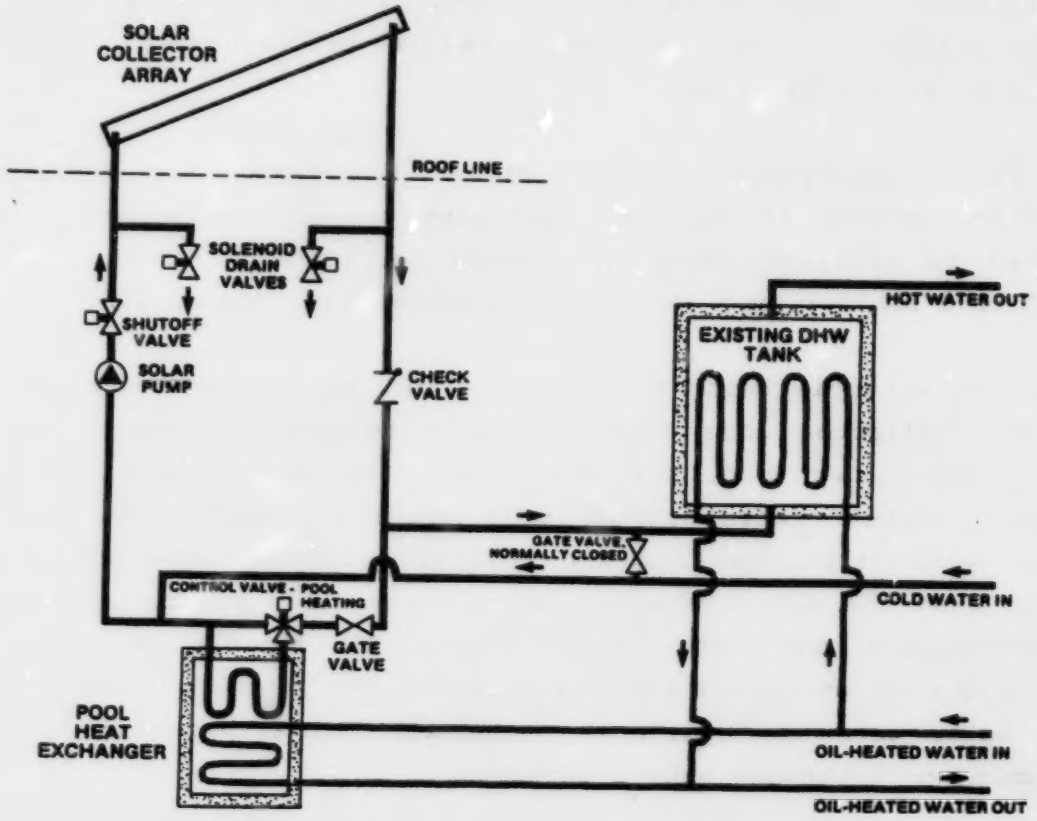
SCALE —

DRAWING NO. J1238 B1 R9

SOLARSYSTEMS

Figure 2


SOLAR COLLECTOR ARRAY
ROOF LINE
SOLENOID DRAIN VALVES
SHUTOFF VALVE
SOLAR PUMP
CHECK VALVE
HOT WATER OUT
EXISTING DHW TANK
GATE VALVE, NORMALLY CLOSED
CONTROL VALVE - POOL HEATING
GATE VALVE
COLD WATER IN
POOL HEAT EXCHANGER
OIL-HEATED WATER IN
OIL-HEATED WATER OUT

The amount of energy required annually for heating domestic water in the building is 2,286 million BTUs. The heating fuel is #5 fuel oil; natural gas is not available on Vancouver Island. Assuming 75% seasonal heating efficiency, 16,400 gallons of oil are required. The selected solar system was estimated to contribute at least 34.5% of the energy requirements, representing 5,600 gallons per year. At early 1983 oil prices, the oil savings would be $6,300 per year.

The drain-down system was selected over the glycol/heat exchanger approach because it was less expensive and more efficient. The system is refilled using city water at mains pressure. This permits a smaller pump and reduced pump energy consumption.

When hot water is being used in the building, solar-heated water in the collector loop flows directly to the hot water tanks. Thus, when under load, the system operates as nearly a straight through system. When hot water is not being used, solar-heated water will circulate from the collector loop to the hot water tanks when the solar water is warmer than 120° F, the set point temperature of the tanks. Solar heating will enable the water in the tanks to attain temperatures up to 160°F. When additional hot solar water is available, heat will be transferred to the swimming pool through a heat exchanger.

The collector circulating pump and collector circuit control valve are controlled by the differential between the cold water temperature and the collector surface temperature. The collector drain valve opens to drain the water from the collectors when the collector surface temperature is lower than 40°F.

INSTALLATION

Based on examination of the plans plus site investigation, no serious problems were expected in interfacing the solar heating system to the existing domestic water and pool heating systems. The most significant problem that did occur was a flow reversal of hot water back through the cold ports of the tempering valves (refer to Figure 1). This resulted in differential thermostat sensors 46 and 47 "seeing" the same temperature, thus causing the system to cycle. This condition was rectified by installing check valves (item 11 in Figure 1).

The roof adjacent to the swimming pool contained a number of exhaust fans and plumbing stack vents which affected the location and arrangement of collector arrays. However, this was not a serious difficulty.

PERFORMANCE

The following instrumentation was installed, for measuring the solar system's performance:

- BTU meter to measure the solar energy supplied by the collectors;
- BTU meter to measure the energy supplied by the oil-heating system;
- pyranometer to measure solar radiation levels;
- kilowatt-hour meter to measure the energy used by the solar circulation pump;

- thermometers in a variety of locations.

The location of the meters is shown in Figure 1.

Partial monitoring started in May 1982, and readings were being obtained from all the meters as of September 1982. The monitoring data and performance results for the one-year period from September 1982 through August 1983 are shown in Table 1 and Figures 3 and 4.

Of the 1,690.2 million BTUs of solar radiation that were incident on the 3,870 square feet (net) of collector surface, 731.3 million BTUs were delivered to the building's hot water system by the solar installation. The delivery of 43.3% of the available solar energy was exceptionally good. Typical percentages for solar domestic hot water systems range from 20 to 37%, averaging about 27%.

The solar installation supplied 32.1% of the McKinnon Building's hot water energy needs over the one-year period. This was close to the pre-installation estimate of 34.5%. The contribution of 731.3 million BTUs was equivalent to a saving of 5,420 gallons of fuel oil, based on boiler efficiency of 75%. The solar installation saved 2.86 GJ of fuel oil/m^2 of collector area over the year. At early 1983 oil prices, the value of the oil saved was $6,100.

The electricity consumed by the solar system was 3,593 kWhs, which cost the University $125 at early 1983 rates. Thus, the net savings for the year were $5,975.

TABLE I

(1) PERIOD	(2) SOLAR RADIATION AVAILABLE	(3) SOLAR ENERGY DELIVERED	(4) %AGE OF AVAILABLE SOLAR ENERGY DELIVERED(a)	(5) ENERGY FROM OIL SYSTEM	(6) SOLAR CONTRIBUTION(b)	(7) ENERGY USED BY SOLAR PUMP	
	million BTUs	million BTUs	%	million BTUs	%	kWh	million BTUs
1982							
Sept.	125.2	59.3	47.2	79.8	42.6	285	1.0
Oct.	111.3	47.6	42.8	157.3	23.2	280	1.0
Nov.	59.3	17.4	29.3	200.5	8.0	145	0.5
Dec.	46.3	12.7	27.4	198.7	6.0	124	0.4
1983							
Jan.	39.4	11.6	29.4	196.9	5.6	118	0.4
Feb.	62.0	24.2	39.0	182.4	11.7	169	0.6
Mar.	131.3	60.6	42.6	155.4	28.1	310	1.0
Apr.	207.5	80.5	38.8	88.7	47.6	375	1.3
May	228.1	106.2	46.6	95.8	52.6	427	1.5
June	203.5	98.0	48.2	61.7	61.4	447	1.5
July	229.7	116.2	50.6	72.0	61.7	504	1.7
Aug.	244.6	97.0	39.7	61.1	61.4	409	1.4
Full Year	1,690.2	731.3	43.3	1,550.3	32.1	3,593	12.3

(a) col. 3 ÷ col. 2, x 100%
(b) col. 3 ÷ (col. 3 + col. 5), x 100%

Figure 3
Solar Energy Collection Efficiency

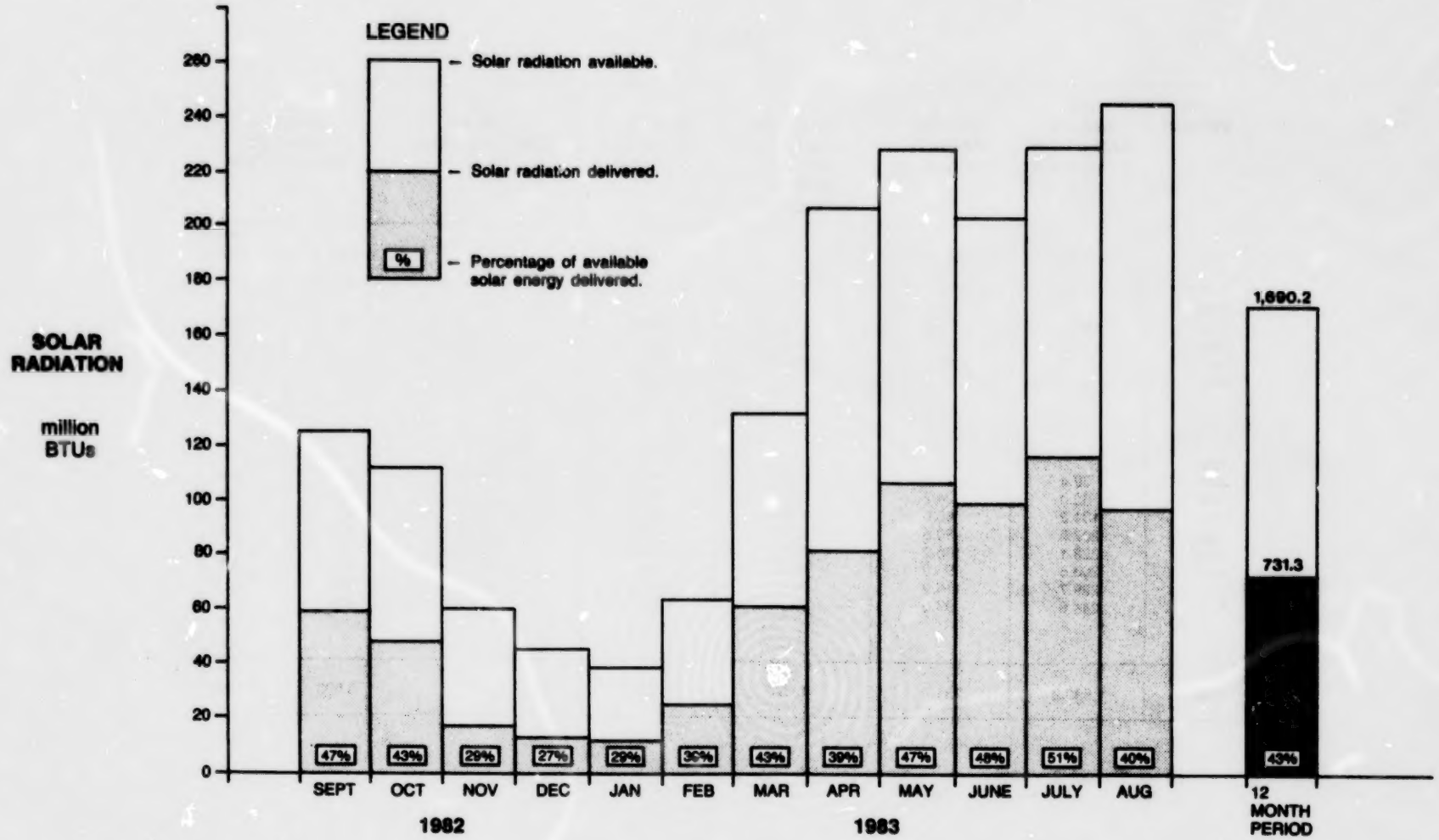
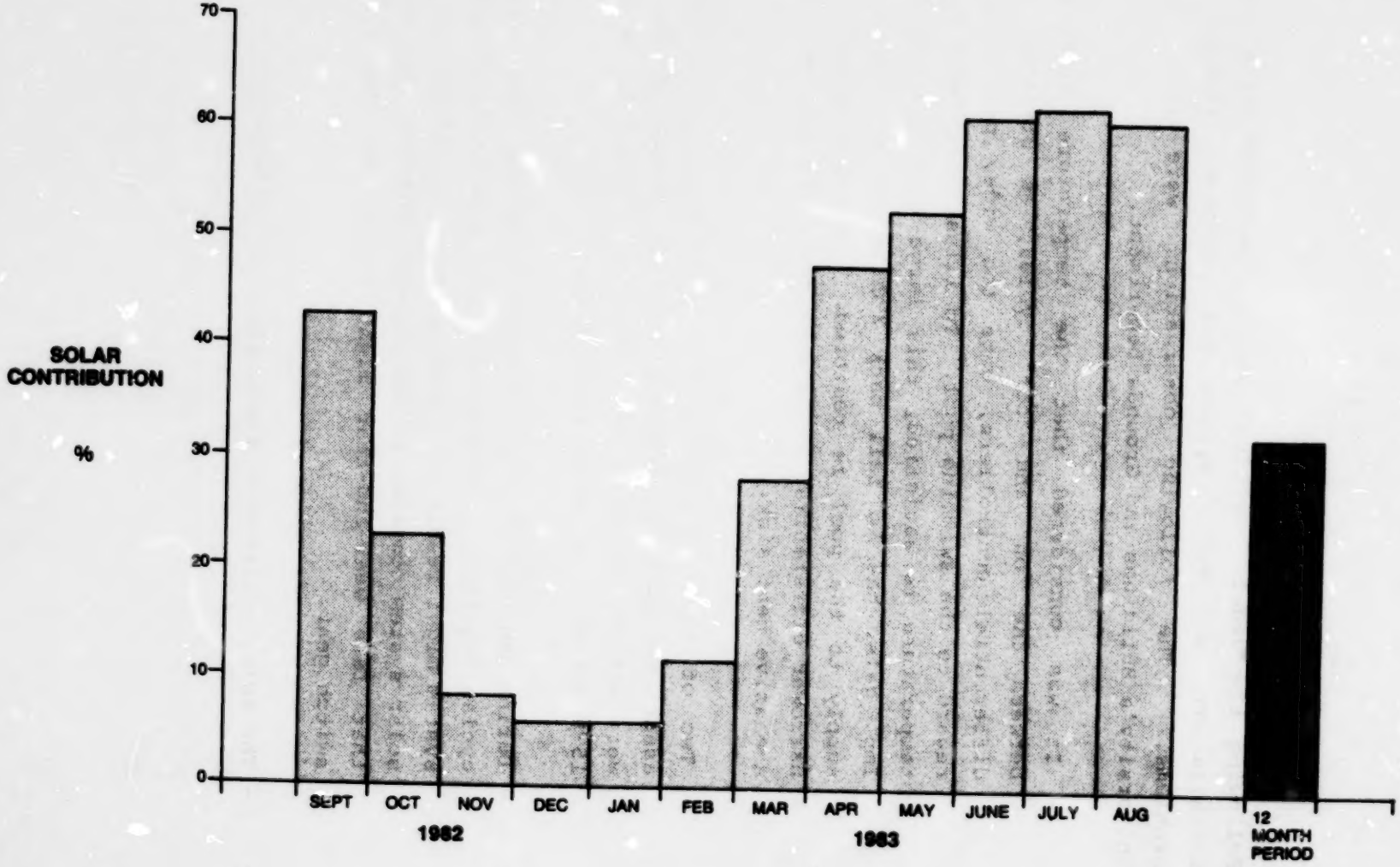


Figure 4
Solar Contribution



Following the usual "teething" period associated with any new installation, the solar system has performed without major problems. The following observations were made by the University's Buildings and Grounds Department:

- It was considered that the temperature differentials between the "on" and "off" cycles, as utilized by the differential controllers, were too wide, particularly in regard to the swimming pool. To illustrate: when the pool temperature is satisfied, this large heat sink of 200,000 Imp. gals. has to fall back 2°C before the solar energy supply to the pool is restored. It would appear that a narrower differential would work better in the case of such a massive heat sink.

- Two of the controllers (Nos. 30 and 31 in Figure 1) associated with the freeze protection aspects of the system were not sensitive enough. They were found to be 6°F and 15°F out of calibration respectively.

- During periods of limited solar radiation, the solar pump cycles regularly. It was felt that a variable flow pumping system might result in improved collection efficiency of the solar system compared to the present constant flow pump, and that less wear-and-tear might result on the electrical switch gear.

- The solar collectors were subject to condensation.

- The tubes and absorber surfaces of the collectors bowed substantially at times of high solar load. The collector supplier advised that the condition would not affect thermal performance or life expectancy. However, lacking an explanation of the cause of the situation, the University still had reservations about the system's life expectancy.

- A modification had to be made to the freeze protection alarm system to stop the alarm bell from ringing during certain periods of filling or draining the solar system.

- The reponse of Solarsystems Industries to problems was very slow.

CONCLUSIONS

The technical performance of the solar installation was excellent. The system supplied 32.1% of the McKinnon Building's hot water energy needs over the one-year monitoring period, saving 5,420 gallons of fuel oil. The system saved 2.86 GJ of fuel oil per square meter of collector area over the year. 43.3% of the available solar energy was delivered to the Building's hot water.

The solar system's maintenance requirements were minimal and the McKinnon Building personnel had no significant problems operating it. Bowing of the tubes and absorber surfaces of the collectors was a concern because the cause of the condition was not adequately explained by Solarsystems Industries Ltd. The response of Solarsystems to problems was, in general, very slow.

Although the system was not economical, saving $5,975 in the first year as compared to its capital cost of approximately $250,000, it effectively demonstrated that solar energy can displace fuel oil in this application. The demonstration was a major contribution to the advancement of solar technology.

APPENDIX

APPENDIX
F CHART COMPUTER ANALYSIS

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	1000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	45.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	6.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

VICTORIA INT'L BC 48.65

****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	1.9	16.25	0.00	194.23	841.	37.
FEB	6.2	25.82	0.00	175.43	675.	40.
MAR	9.4	38.39	0.00	194.23	600.	42.
APR	13.3	48.16	0.00	187.96	500.	47.
MAY	14.6	53.51	0.00	194.23	344.	53.
JUN	15.1	53.05	0.00	187.96	194.	58.
JUL	15.8	56.49	0.00	194.23	110.	62.
AUG	14.8	53.01	0.00	194.23	117.	61.
SEP	14.1	48.95	0.00	187.96	220.	57.
OCT	7.3	30.76	0.00	194.23	445.	50.
NOV	4.2	21.65	0.00	187.96	635.	43.
DEC	1.3	14.24	0.00	194.23	769.	40.
ANN	9.8	460.27	0.00	2286.91	5537.	

Single glazed collector, selective absorber,
tilt angle 45 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2.....	2.00	
2	COLLECTOR AREA.....	2000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)..	.69	
4	FRPRIME-UL PRODUCT.....	.77	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS.....	1.00	
6	COLLECTOR SLOPE.....	45.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90).....	.00	DEGREES
8	STORAGE CAPACITY.....	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA.....	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION.....	0.00	BTU/DAY
11	(EPSILON)(CAIND/(EFFECTIVE BUILDING UA).....	.50	
12	HOT WATER USAGE.....	10000.00	GAL/DAY
13	WATER SET TEMPERATURE.....	125.00	F
14	WATER MAIN TEMPERATURE.....	50.00	F
15	CITY CALL NUMBER.....	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2.....	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2.....	2.00	

VICTORIA INT'L BC 48.65

****THERMAL ANALYSIS****

TIME	PERCENT INCIDENT SOLAR	SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	3.7	32.58	0.00	194.23	841.	37.
FEB	12.0	51.63	0.00	175.43	675.	40.
MAR	18.2	76.78	0.00	194.23	698.	42.
APR	25.3	96.31	0.00	187.96	588.	47.
MAY	27.7	107.01	0.00	194.23	344.	53.
JUN	28.7	106.10	0.00	187.96	194.	58.
JUL	30.1	112.98	0.00	194.23	110.	62.
AUG	28.3	106.82	0.00	194.23	117.	61.
SEP	26.0	97.90.	0.00	187.96	220.	57.
OCT	14.1	61.52	0.00	194.23	445.	50.
NOV	8.2	43.30	0.00	187.96	635.	43.
DEC	2.6	28.48	0.00	194.23	769.	40.
ANN	18.8	920.54	0.00	2286.91	5537.	

Single glazed collector, selective absorber,
tilt angle 45 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	3000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	45.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

VICTORIA INT'L BC 48.65

****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	5.6	48.75	0.00	194.23	841.	37.
FEB	17.5	77.45	0.00	175.43	675.	40.
MAR	26.3	115.17	0.00	194.23	600.	42.
APR	36.2	144.47	0.00	187.96	500.	47.
MAY	39.6	168.52	0.00	194.23	344.	53.
JUN	41.0	159.15	0.00	187.96	194.	58.
JUL	42.9	169.47	0.00	194.23	110.	62.
AUG	40.4	159.03	0.00	194.23	117.	61.
SEP	38.4	146.85	0.00	187.96	220.	57.
OCT	28.6	92.27	0.00	194.23	445.	50.
NOV	12.1	64.95	0.00	187.96	635.	43.
DEC	3.9	42.72	0.00	194.23	769.	40.
ANN	27.1	1380.82	0.00	2206.91	5537.	

Single glazed collector, selective absorber, tilt angle 45 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	4000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/H-F-FT2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	45.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

VICTORIA INT'L BC 48.65

****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	7.4	65.81	0.00	194.23	841.	37.
FEB	22.7	183.26	0.00	175.43	675.	48.
MAR	33.8	153.57	0.00	194.23	688.	42.
APR	46.1	192.62	0.00	187.96	588.	47.
MAY	58.2	214.82	0.00	194.23	344.	53.
JUN	52.0	212.28	0.00	187.96	194.	58.
JUL	54.3	225.97	0.00	194.23	118.	62.
AUG	51.3	212.84	0.00	194.23	117.	61.
SEP	48.8	195.80	0.00	187.96	228.	57.
OCT	26.6	123.83	0.00	194.23	445.	50.
NOV	15.8	86.61	0.00	187.96	635.	43.
DEC	5.2	56.97	0.00	194.23	769.	40.
ANN	34.5	1841.09	0.00	2286.91	5537.	

Single glazed collector, selective absorber, tilt angle 45 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	5360.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/H-F-FT2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	45.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

VICTORIA INT'L BC 48.65

****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	9.2	81.26	0.00	194.23	841.	37.
FEB	27.6	129.00	0.00	175.43	675.	40.
MAR	48.7	191.96	0.00	194.23	688.	42.
APR	54.9	248.78	0.00	187.96	588.	47.
MAY	59.7	267.53	0.00	194.23	344.	53.
JUN	61.7	265.25	0.00	187.96	194.	58.
JUL	64.4	282.46	0.00	194.23	118.	62.
AUG	61.8	265.04	0.00	194.23	117.	61.
SEP	58.1	244.75	0.00	187.96	228.	57.
OCT	32.3	153.79	0.00	194.23	445.	50.
NOV	19.4	108.26	0.00	187.96	635.	43.
DEC	6.6	71.21	0.00	194.23	769.	40.
ANN	41.3	2381.36	0.00	2286.91	5337.	

Single glazed collector, selective absorber,
tilt angle 45 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2.....	2.00	
2	COLLECTOR AREA.....	6000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)..	.69	
4	FRPRIME-UL PRODUCT.....	.77	BTU/HR-F-FT2
5	NUMBER OF TRANSPARENT COVERS.....	1.00	
6	COLLECTOR SLOPE.....	45.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90).....	.00	DEGREES
8	STORAGE CAPACITY.....	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA.....	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION.....	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA).....	.50	
12	HOT WATER USAGE.....	10000.00	GAL/DAY
13	WATER SET TEMPERATURE.....	125.00	F
14	WATER MAIN TEMPERATURE.....	50.00	F
15	CITY CALL NUMBER.....	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2.....	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2.....	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	18.9	97.51	0.00	194.23	841.	37.
FEB	32.2	154.89	0.00	175.43	675.	40.
MAR	47.0	238.35	0.00	194.23	600.	42.
APR	62.7	288.93	0.00	187.96	500.	47.
MAY	68.0	321.04	0.00	194.23	344.	53.
JUN	70.3	318.30	0.00	187.96	194.	58.
JUL	73.2	338.95	0.00	194.23	110.	62.
AUG	69.6	318.05	0.00	194.23	117.	61.
SEP	66.4	293.71	0.00	187.96	220.	57.
OCT	37.6	194.55	0.00	194.23	445.	50.
NOV	22.8	129.91	0.00	187.96	635.	43.
DEC	7.9	85.45	0.00	194.23	769.	40.
ANN	47.4	2761.63	0.00	2286.91	5537.	

Single glazed collector, selective absorber, tilt angle 45 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	1000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	22.50	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	.5	13.16	0.00	194.23	841.	37.
FEB	4.4	21.93	0.00	175.43	675.	40.
MAR	8.3	35.58	0.00	194.23	688.	42.
APR	13.4	48.89	0.00	187.96	508.	47.
MAY	16.2	58.24	0.00	194.23	344.	53.
JUN	17.4	59.54	0.00	187.96	194.	58.
JUL	17.9	62.56	0.00	194.23	118.	62.
AUG	15.6	55.44	0.00	194.23	117.	61.
SEP	13.1	46.60	0.00	187.96	220.	57.
OCT	5.7	26.94	0.00	194.23	445.	50.
NOV	2.3	17.45	0.00	187.96	635.	43.
DEC	.0	11.31	0.00	194.23	769.	40.
ANN	9.6	457.64	0.00	2286.91	5537.	

Single glazed collector, selective absorber, tilt angle 22.5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	2000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/HR-F-FT2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	22.50	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	1.1	26.32	0.00	194.23	841.	37.
FEB	8.5	43.87	0.00	175.43	675.	40.
MAR	16.0	71.16	0.00	194.23	600.	42.
APR	25.6	97.78	0.00	187.96	500.	47.
MAY	30.7	116.48	0.00	194.23	344.	53.
JUN	33.0	119.00	0.00	187.96	194.	58.
JUL	33.9	125.13	0.00	194.23	110.	62.
AUG	29.7	110.00	0.00	194.23	117.	61.
SEP	25.0	93.20	0.00	187.96	220.	57.
OCT	11.1	53.87	0.00	194.23	445.	50.
NOV	4.6	34.89	0.00	187.96	635.	43.
DEC	.1	22.63	0.00	194.23	769.	40.
ANN	18.3	915.29	0.00	2286.91	5537.	

Single glazed collector, selective absorber, tilt angle 22.5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	3000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	22.50	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	1.7	39.49	0.00	194.23	841.	37.
FEB	12.5	65.80	0.00	175.43	675.	40.
MAR	23.2	106.74	0.00	194.23	680.	42.
APR	36.7	146.67	0.00	187.96	588.	47.
MAY	43.6	174.72	0.00	194.23	344.	53.
JUN	46.7	178.62	0.00	187.96	194.	58.
JUL	48.0	187.69	0.00	194.23	110.	62.
AUG	42.4	166.32	0.00	194.23	117.	61.
SEP	35.9	139.80	0.00	187.96	220.	57.
OCT	16.3	88.81	0.00	194.23	445.	50.
NOV	6.9	52.34	0.00	187.96	635.	43.
DEC	.2	33.94	0.00	194.23	769.	40.
ANN	25.2	1372.93	0.00	2286.91	5537.	

Single glazed collector, selective absorber, tilt angle 22.5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	4000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	22.50	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	2.3	52.65	0.00	194.23	841.	37.
FEB	16.4	87.73	0.00	175.43	675.	48.
MAR	29.9	142.33	0.00	194.23	600.	42.
APR	46.6	195.56	0.00	187.96	508.	47.
MAY	55.1	232.96	0.00	194.23	344.	53.
JUN	58.8	238.17	0.00	187.96	194.	58.
JUL	68.4	258.26	0.00	194.23	118.	62.
AUG	53.7	221.76	0.00	194.23	117.	61.
SEP	45.7	186.39	0.00	187.96	228.	57.
OCT	21.1	107.74	0.00	194.23	445.	50.
NOV	9.1	69.79	0.00	187.96	635.	43.
DEC	.3	45.25	0.00	194.23	769.	40.
ANN	33.4	1838.57	0.00	2286.91	5537.	

Single glazed collector, selective absorber, tilt angle 22.5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	5000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	22.50	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	3.0	65.81	0.00	194.23	841.	37.
FEB	20.0	189.66	0.00	175.43	675.	40.
MAR	36.2	177.91	0.00	194.23	600.	42.
APR	55.5	244.44	0.00	187.96	500.	47.
MAY	65.1	291.20	0.00	194.23	344.	53.
JUN	69.4	297.71	0.00	187.96	194.	58.
JUL	71.2	312.82	0.00	194.23	110.	62.
AUG	63.7	277.20	0.00	194.23	117.	61.
SEP	54.6	232.99	0.00	187.96	220.	57.
OCT	25.8	134.68	0.00	194.23	445.	50.
NOV	11.2	87.23	0.00	187.96	635.	43.
DEC	.6	56.56	0.00	194.23	769.	40.
ANN	39.8	2288.21	0.00	2286.91	5337.	

Single glazed collector, selective absorber, tilt angle 22.5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	6000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	22.50	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	3.7	78.97	0.00	194.23	841.	37.
FEB	23.6	131.60	0.00	175.43	675.	40.
MAR	41.9	213.49	0.00	194.23	600.	42.
APR	63.4	293.33	0.00	187.96	500.	47.
MAY	73.8	349.44	0.00	194.23	344.	53.
JUN	78.5	357.25	0.00	187.96	194.	58.
JUL	80.5	375.39	0.00	194.23	110.	62.
AUG	72.5	332.63	0.00	194.23	117.	61.
SEP	62.5	279.59	0.00	187.96	220.	57.
OCT	38.2	161.61	0.00	194.23	445.	50.
NOV	13.3	104.60	0.00	187.96	635.	43.
DEC	.8	67.80	0.00	194.23	769.	40.
ANN	45.5	2745.86	0.00	2286.91	5537.	

Single glazed collector, selective absorber, tilt angle 22.5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	1000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	10.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	99.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

VICTORIA INT'L BC 48.65

****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	18.76	0.00	194.23	841.	37.
FEB	2.8	18.61	0.00	175.43	675.	40.
MAR	6.9	32.20	0.00	194.23	600.	42.
APR	12.6	46.93	0.00	187.96	500.	47.
MAY	16.2	58.41	0.00	194.23	344.	53.
JUN	17.8	60.85	0.00	187.96	194.	58.
JUL	18.1	63.39	0.00	194.23	110.	62.
AUG	15.1	54.21	0.00	194.23	117.	61.
SEP	11.5	42.84	0.00	187.96	220.	57.
OCT	4.2	23.41	0.00	194.23	445.	50.
NOV	.9	14.16	0.00	187.96	635.	43.
DEC	0.0	9.09	0.00	194.23	769.	40.
ANN	8.9	434.84	0.00	2286.91	5537.	

Single glazed collector, selective absorber, tilt angle 10 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	2000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/H-F-FT2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	10.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

VICTORIA INT'L BC 48.65

****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	21.51	0.00	194.23	841.	37.
FEB	5.5	37.22	0.00	175.43	675.	40.
MAR	13.4	64.48	0.00	194.23	680.	42.
APR	24.1	93.86	0.00	187.96	508.	47.
MAY	38.6	116.81	0.00	194.23	344.	53.
JUN	33.7	121.69	0.00	187.96	194.	58.
JUL	34.3	126.78	0.00	194.23	118.	62.
AUG	28.8	108.42	0.00	194.23	117.	61.
SEP	22.1	85.67	0.00	187.96	228.	57.
OCT	8.2	46.81	0.00	194.23	445.	50.
NOV	1.7	28.32	0.00	187.96	635.	43.
DEC	0.0	18.17	0.00	194.23	769.	40.
ANN	16.9	869.68	0.00	2286.91	5537.	

Single glazed collector, selective absorber, tilt angle 10 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2.....	2.00	
2	COLLECTOR AREA.....	3000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)..	.69	
4	FRPRIME-UL PRODUCT.....	.77	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS.....	1.00	
6	COLLECTOR SLOPE.....	10.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90).....	.00	DEGREES
8	STORAGE CAPACITY.....	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA.....	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION.....	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA).....	.50	
12	HOT WATER USAGE.....	10000.00	GAL/DAY
13	WATER SET TEMPERATURE.....	125.00	F
14	WATER MAIN TEMPERATURE.....	50.00	F
15	CITY CALL NUMBER.....	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2.....	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2.....	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	32.27	0.00	194.23	841.	37.
FEB	8.1	55.83	0.00	175.43	675.	40.
MAR	19.5	96.60	0.00	194.23	688.	42.
APR	34.6	148.79	0.00	187.96	508.	47.
MAY	43.5	175.22	0.00	194.23	344.	53.
JUN	47.7	182.54	0.00	187.96	194.	58.
JUL	48.5	190.17	0.00	194.23	118.	62.
AUG	41.1	162.63	0.00	194.23	117.	61.
SEP	31.8	128.51	0.00	187.96	228.	57.
OCT	12.1	78.22	0.00	194.23	445.	50.
NOV	2.6	42.48	0.00	187.96	635.	43.
DEC	0.0	27.26	0.00	194.23	769.	40.
ANN	24.2	1384.51	0.00	2286.91	5537.	

Single glazed collector, selective absorber, tilt angle 10 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	4000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/H-F-FT2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	10.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	43.82	0.00	194.23	841.	37.
FEB	10.7	74.44	0.00	175.43	675.	40.
MAR	25.2	128.80	0.00	194.23	698.	42.
APR	44.0	187.72	0.00	187.96	588.	47.
MAY	55.0	233.63	0.00	194.23	344.	53.
JUN	60.0	243.39	0.00	187.96	194.	58.
JUL	61.0	253.56	0.00	194.23	118.	62.
AUG	52.1	216.84	0.00	194.23	117.	61.
SEP	40.8	171.35	0.00	187.96	228.	57.
OCT	15.8	93.63	0.00	194.23	445.	50.
NOV	3.5	56.64	0.00	187.96	635.	43.
DEC	0.0	36.34	0.00	194.23	769.	40.
ANN	30.8	1739.35	0.00	2286.91	5537.	

Single glazed collector, selective absorber, tilt angle 10 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	5000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	10.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	53.78	0.00	194.23	841.	37.
FEB	13.2	93.85	0.00	175.43	675.	40.
MAR	38.6	168.99	0.00	194.23	688.	42.
APR	52.6	234.65	0.00	187.96	588.	47.
MAY	65.0	292.03	0.00	194.23	344.	53.
JUN	78.6	384.24	0.00	187.96	194.	58.
JUL	71.9	316.95	0.00	194.23	118.	62.
AUG	61.9	271.06	0.00	194.23	117.	61.
SEP	48.9	214.19	0.00	187.96	228.	57.
OCT	19.4	117.03	0.00	194.23	445.	50.
NOV	4.4	78.88	0.00	187.96	635.	43.
DEC	0.0	45.43	0.00	194.23	769.	40.
ANN	36.6	2174.19	0.00	2286.91	5537.	

Single glazed collector, selective absorber, tilt angle 10 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	6000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.69	
4	FRPRIME-UL PRODUCT	.77	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	10.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	64.53	0.00	194.23	841.	37.
FEB	15.6	111.66	0.00	175.43	675.	40.
MAR	35.6	193.19	0.00	194.23	688.	42.
APR	60.2	281.58	0.00	187.96	588.	47.
MAY	73.8	350.44	0.00	194.23	344.	53.
JUN	79.8	365.00	0.00	187.96	194.	58.
JUL	81.2	380.34	0.00	194.23	110.	62.
AUG	70.5	325.27	0.00	194.23	117.	61.
SEP	56.3	257.02	0.00	187.96	220.	57.
OCT	22.8	140.44	0.00	194.23	445.	50.
NOV	5.4	84.96	0.00	187.96	635.	43.
DEC	0.0	54.52	0.00	194.23	769.	40.
ANN	41.9	2600.03	0.00	2286.91	5537.	

Single glazed collector, selective absorber, tilt angle 10 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2.....	2.00	
2	COLLECTOR AREA.....	1000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)..	.63	
4	FRPRIME-UL PRODUCT.....	1.04	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS.....	1.00	
6	COLLECTOR SLOPE.....	45.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90).....	.00	DEGREES
8	STORAGE CAPACITY.....	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA.....	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION.....	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA).....	.50	
12	HOT WATER USAGE.....	10000.00	GAL/DAY
13	WATER SET TEMPERATURE.....	125.00	F
14	WATER MAIN TEMPERATURE.....	50.00	F
15	CITY CALL NUMBER.....	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2.....	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2.....	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	.2	16.25	0.00	194.23	841.	37.
FEB	4.2	25.82	0.00	175.43	675.	40.
MAR	7.2	38.39	0.00	194.23	608.	42.
APR	10.8	48.16	0.00	187.96	508.	47.
MAY	12.1	53.51	0.00	194.23	344.	53.
JUN	12.7	53.85	0.00	187.96	194.	58.
JUL	13.4	56.49	0.00	194.23	118.	62.
AUG	12.5	53.01	0.00	194.23	117.	61.
SEP	11.7	48.95	0.00	187.96	228.	57.
OCT	5.4	38.76	0.00	194.23	445.	50.
NOV	2.4	21.65	0.00	187.96	635.	43.
DEC	0.0	14.24	0.00	194.23	769.	40.
ANN	7.7	468.27	0.00	2285.91	5537.	

Single glazed collector, non-selective absorber,
tilt angle 45 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	2000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	45.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	.5	32.58	0.00	194.23	841.	37.
FEB	8.2	51.63	0.00	175.43	675.	48.
MAR	14.8	76.78	0.00	194.23	588.	42.
APR	28.7	96.31	0.00	187.96	588.	47.
MAY	23.2	187.81	0.00	194.23	344.	51.
JUN	24.2	186.18	0.00	187.96	194.	58.
JUL	25.6	112.98	0.00	194.23	118.	62.
AUG	23.9	186.82	0.00	194.23	117.	61.
SEP	22.4	97.98	0.00	187.96	228.	57.
OCT	18.5	61.52	0.00	194.23	445.	50.
NOV	4.8	43.38	0.00	187.96	635.	43.
DEC	0.0	28.48	0.00	194.23	769.	40.
ANN	14.9	928.54	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber,
tilt angle 45 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2.....	2.00	
2	COLLECTOR AREA.....	3000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)..	.63	
4	FRPRIME-UL PRODUCT.....	1.04	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS.....	1.00	
6	COLLECTOR SLOPE.....	45.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90).....	.00	DEGREES
8	STORAGE CAPACITY.....	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA.....	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION.....	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA).....	.50	
12	HOT WATER USAGE.....	10000.00	GAL/DAY
13	WATER SET TEMPERATURE.....	125.00	F
14	WATER MAIN TEMPERATURE.....	50.00	F
15	CITY CALL NUMBER.....	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2.....	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2.....	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	.9	48.75	0.00	194.23	841.	37.
FEB	12.0	77.45	0.00	175.43	675.	40.
MAR	28.3	115.17	0.00	194.23	698.	42.
APR	29.7	144.47	0.00	187.96	588.	47.
MAY	33.2	168.52	0.00	194.23	344.	53.
JUN	34.7	159.15	0.00	187.96	194.	58.
JUL	36.6	169.47	0.00	194.23	118.	62.
AUG	34.3	159.03	0.00	194.23	117.	61.
SEP	32.2	146.85	0.00	187.96	228.	57.
OCT	15.3	92.27	0.00	194.23	445.	50.
NOV	7.2	64.95	0.00	187.96	635.	43.
DEC	0.0	42.72	0.00	194.23	769.	40.
ANN	21.4	1388.82	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber,
tilt angle 45 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	4000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/HR-F-FT2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	45.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	1.3	65.01	0.00	194.23	841.	37.
FEB	15.7	183.26	0.00	175.43	675.	40.
MAR	26.1	153.57	0.00	194.23	688.	42.
APR	37.9	192.62	0.00	187.96	588.	47.
MAY	42.2	214.82	0.00	194.23	344.	53.
JUN	44.1	212.20	0.00	187.96	194.	58.
JUL	46.5	225.97	0.00	194.23	110.	62.
AUG	43.6	212.84	0.00	194.23	117.	61.
SEP	41.0	195.80	0.00	187.96	220.	57.
OCT	19.9	123.03	0.00	194.23	445.	50.
NOV	9.5	86.61	0.00	187.96	635.	43.
DEC	0.0	56.97	0.00	194.23	769.	40.
ANN	27.4	1841.89	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber,
tilt angle 45 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	5000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/H-F-FT2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	45.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	1.9	81.26	0.00	194.23	841.	37.
FEB	19.2	129.00	0.00	175.43	675.	48.
MAR	31.6	191.36	0.00	194.23	600.	42.
APR	45.3	248.78	0.00	187.96	508.	47.
MAY	50.3	267.53	0.00	194.23	344.	53.
JUN	52.5	265.25	0.00	187.96	194.	58.
JUL	55.3	282.46	0.00	194.23	110.	62.
AUG	52.0	265.04	0.00	194.23	117.	61.
SEP	49.0	244.75	0.00	187.96	220.	57.
OCT	24.2	153.79	0.00	194.23	445.	50.
NOV	11.7	108.26	0.00	187.96	635.	43.
DEC	0.0	71.21	0.00	194.23	769.	40.
ANN	32.0	2301.36	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber,
tilt angle 45 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	6000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/HR-F-FT2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	45.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

VICTORIA INT'L BC 48.65

****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	2.5	97.51	0.00	194.23	841.	37.
FEB	22.6	154.89	0.00	175.43	675.	48.
MAR	36.6	238.35	0.00	194.23	688.	42.
APR	52.0	288.93	0.00	187.96	588.	47.
MAY	57.5	321.04	0.00	194.23	344.	53.
JUN	68.0	318.38	0.00	187.96	194.	58.
JUL	63.1	338.95	0.00	194.23	118.	62.
AUG	59.5	318.85	0.00	194.23	117.	61.
SEP	56.1	293.71	0.00	187.96	228.	57.
OCT	28.3	184.55	0.00	194.23	445.	50.
NOV	14.0	129.91	0.00	187.96	635.	43.
DEC	0.0	85.45	0.00	194.23	769.	40.
ANN	37.7	2761.63	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber, tilt angle 45 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	1000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/H-F-FT2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	22.50	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

VICTORIA INT'L BC 48.65

****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	13.16	0.00	194.23	841.	37.
FEB	2.5	21.93	0.00	175.43	675.	40.
MAR	6.1	35.58	0.00	194.23	600.	42.
APR	11.0	48.69	0.00	187.96	500.	47.
MAY	13.6	58.24	0.00	194.23	344.	53.
JUN	14.8	59.54	0.00	187.96	194.	58.
JUL	15.4	62.56	0.00	194.23	110.	62.
AUG	13.2	55.44	0.00	194.23	117.	61.
SEP	10.8	46.60	0.00	187.96	220.	57.
OCT	3.9	26.94	0.00	194.23	445.	50.
NOV	.7	17.45	0.00	187.96	635.	43.
DEC	0.0	11.31	0.00	194.23	769.	40.
ANN	7.7	457.64	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber,
tilt angle 22.5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	2000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	22.50	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	26.32	0.00	194.23	841.	37.
FEB	5.0	43.87	0.00	175.43	675.	40.
MAR	11.9	71.16	0.00	194.23	600.	42.
APR	21.0	97.78	0.00	187.96	588.	47.
MAY	25.9	116.48	0.00	194.23	344.	53.
JUN	28.2	119.00	0.00	187.96	194.	58.
JUL	29.2	125.13	0.00	194.23	118.	62.
AUG	25.3	110.00	0.00	134.23	117.	61.
SEP	20.7	93.20	0.00	187.96	220.	57.
OCT	7.7	53.87	0.00	194.23	445.	50.
NOV	1.5	34.09	0.00	187.96	535.	43.
DEC	0.0	22.63	0.00	194.23	769.	40.
ANN	14.7	915.29	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber, tilt angle 22.5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	3000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FPPRIME-UL PRODUCT	1.04	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	22.50	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	39.49	0.00	194.23	841.	37.
FEB	7.4	65.80	0.00	175.43	675.	40.
MAR	17.4	106.74	0.00	194.23	600.	42.
APR	38.2	146.67	0.00	187.96	500.	47.
MAY	36.9	174.72	0.00	194.23	344.	53.
JUN	40.1	178.62	0.00	187.96	194.	58.
JUL	41.4	187.69	0.00	194.23	110.	62.
AUG	36.1	166.32	0.00	194.23	117.	61.
SEP	29.8	139.80	0.00	187.96	220.	57.
OCT	11.3	80.81	0.00	194.23	445.	50.
NOV	2.3	52.34	0.00	187.96	635.	43.
DEC	0.0	33.94	0.00	194.23	769.	40.
ANN	21.1	1372.93	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber, tilt angle 22.5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	4000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	22.50	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	..50	
12	HOT WATER USAGE	18000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	52.65	0.00	194.23	941.	37.
FEB	9.8	87.73	0.00	175.43	675.	48.
MAR	22.5	142.33	0.00	194.23	698.	42.
APR	38.4	195.56	0.00	187.96	508.	47.
MAY	46.8	232.96	0.00	194.23	344.	53.
JUN	50.6	238.17	0.00	187.96	194.	58.
JUL	52.3	250.26	0.00	194.23	118.	62.
AUG	45.9	221.76	0.00	194.23	117.	61.
SEP	38.1	186.39	0.00	187.96	228.	57.
OCT	14.8	107.74	0.00	194.23	445.	50.
NOV	3.2	69.79	0.00	187.96	635.	43.
DEC	0.0	45.25	0.00	194.23	769.	40.
ANN	26.9	1830.57	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber,
tilt angle 22.5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	5000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	22.50	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	65.81	0.00	194.23	841.	37.
FEB	12.2	189.66	0.00	175.43	675.	40.
MAR	27.3	177.91	0.00	194.23	680.	42.
APR	45.9	244.44	0.00	187.96	588.	47.
MAY	55.5	291.20	0.00	194.23	344.	53.
JUN	59.9	297.71	0.00	187.96	194.	58.
JUL	61.9	312.82	0.00	194.23	110.	62.
AUG	54.6	277.20	0.00	194.23	117.	61.
SEP	45.7	232.99	0.00	187.96	220.	57.
OCT	18.1	134.68	0.00	194.23	445.	50.
NOV	4.2	87.23	0.00	187.96	635.	43.
DEC	0.0	56.56	0.00	194.23	769.	40.
ANN	32.2	2288.21	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber, tilt angle 22.5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	6000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	22.50	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	78.97	0.00	194.23	841.	37.
FEB	14.5	131.60	0.00	175.43	675.	40.
MAR	31.8	213.49	0.00	194.23	680.	42.
APR	52.7	293.33	0.00	187.96	508.	47.
MAY	63.1	349.44	0.00	194.23	344.	53.
JUN	68.0	357.25	0.00	187.96	194.	58.
JUL	70.2	375.39	0.00	194.23	118.	62.
AUG	62.3	332.63	0.00	194.23	117.	61.
SEP	52.5	279.59	0.00	187.96	220.	57.
OCT	21.3	161.61	0.00	194.23	445.	50.
NOV	5.2	104.68	0.00	187.96	635.	43.
DEC	0.0	67.88	0.00	194.23	769.	40.
ANN	36.9	2745.86	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber, tilt angle 22.5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	1000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	10.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	18.76	0.00	194.23	841.	37.
FEB	1.1	18.61	0.00	175.43	675.	48.
MAR	4.9	32.20	0.00	194.23	688.	42.
APR	10.2	46.93	0.00	187.96	508.	47.
MAY	13.6	58.41	0.00	194.23	344.	53.
JUN	15.2	60.85	0.00	187.96	194.	58.
JUL	15.6	63.39	0.00	194.23	118.	62.
AUG	12.8	54.21	0.00	194.23	117.	61.
SEP	9.4	42.84	0.00	187.96	228.	57.
OCT	2.6	23.41	0.00	194.23	445.	50.
NOV	0.0	14.16	0.00	187.96	635.	43.
DEC	0.0	9.09	0.00	194.23	769.	40.
ANN	7.1	434.84	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber, tilt angle 10 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	2000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/H-F-FT2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	10.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON(CHIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	21.51	0.00	194.23	841.	37.
FEB	2.2	37.22	0.00	175.43	675.	40.
MAR	9.5	64.48	0.00	194.23	688.	42.
APR	19.6	93.86	0.00	187.96	508.	47.
MAY	25.9	116.81	0.00	194.23	344.	53.
JUN	28.8	121.69	0.00	187.96	194.	58.
JUL	29.5	126.78	0.00	194.23	118.	62.
AUG	24.4	108.42	0.00	194.23	117.	61.
SEP	18.1	85.67	0.00	187.96	228.	57.
OCT	5.0	46.81	0.00	194.23	445.	50.
NOV	0.0	28.32	0.00	187.96	635.	43.
DEC	0.0	18.17	0.00	194.23	769.	40.
ANN	13.6	869.68	0.00	2206.91	5537.	

Single glazed collector, non-selective absorber,
tilt angle 10 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	3000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	10.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CNUM)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	32.27	0.00	194.23	841.	37.
FEB	3.4	55.83	0.00	175.43	675.	40.
MAR	13.9	96.68	0.00	194.23	698.	42.
APR	28.2	148.79	0.00	187.96	508.	47.
MAY	36.9	175.22	0.00	194.23	344.	53.
JUN	41.0	182.54	0.00	187.96	194.	58.
JUL	41.9	198.17	0.00	194.23	118.	62.
AUG	34.9	162.63	0.00	194.23	117.	61.
SEP	26.1	128.51	0.00	187.96	228.	57.
OCT	7.5	78.22	0.00	194.23	445.	50.
NOV	0.0	42.48	0.00	187.96	635.	43.
DEC	0.0	27.26	0.00	194.23	769.	40.
ANN	19.6	1304.51	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber, tilt angle 10 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	4000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/H-F-FT2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	10.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	85.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

VICTORIA INT'L BC 48.65

****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	43.82	0.00	194.23	841.	37.
FEB	4.6	74.44	0.00	175.43	675.	40.
MAR	18.1	128.00	0.00	194.23	600.	42.
APR	36.0	187.72	0.00	187.96	388.	47.
MAY	46.7	233.63	0.00	194.23	344.	53.
JUN	51.7	243.39	0.00	187.96	194.	58.
JUL	52.9	253.56	0.00	194.23	118.	62.
AUG	44.4	216.84	0.00	194.23	117.	61.
SEP	33.5	171.35	0.00	187.96	228.	57.
OCT	9.9	93.63	0.00	194.23	445.	50.
NOV	0.0	56.64	0.00	187.96	635.	43.
DEC	0.0	36.34	0.00	194.23	769.	40.
ANN	24.9	1739.35	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber, tilt angle 10 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	5000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	10.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

VICTORIA INT'L BC 48.65

****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	53.78	0.00	194.23	841.	37.
FEB	5.8	93.85	0.00	175.43	675.	40.
MAR	22.1	168.99	0.00	194.23	688.	42.
APR	43.1	234.65	0.00	187.96	588.	47.
MAY	55.4	292.83	0.00	194.23	344.	53.
JUN	61.1	304.24	0.00	187.96	194.	58.
JUL	62.5	316.95	0.00	194.23	118.	62.
AUG	52.9	271.86	0.00	194.23	117.	61.
SEP	40.3	214.19	0.00	187.96	228.	57.
OCT	12.2	117.83	0.00	194.23	445.	50.
NOV	0.0	70.00	0.00	187.96	635.	43.
DEC	0.0	45.43	0.00	194.23	769.	40.
ANN	29.7	2174.19	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber, tilt angle 10 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	6000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.63	
4	FRPRIME-UL PRODUCT	1.04	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	10.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	64.53	0.00	194.23	841.	37.
FEB	7.1	111.66	0.00	175.43	675.	40.
MAR	25.9	193.19	0.00	194.23	600.	42.
APR	49.6	281.58	0.00	187.96	500.	47.
MAY	63.0	350.44	0.00	194.23	344.	53.
JUN	69.3	365.00	0.00	187.96	194.	58.
JUL	70.8	388.34	0.00	194.23	110.	62.
AUG	60.4	325.27	0.00	194.23	117.	61.
SEP	46.5	257.02	0.00	187.96	220.	57.
OCT	14.5	140.44	0.00	194.23	445.	50.
NOV	0.0	84.96	0.00	187.96	635.	43.
DEC	0.0	54.52	0.00	194.23	769.	40.
ANN	34.1	2689.03	0.00	2286.91	5537.	

Single glazed collector, non-selective absorber,
tilt angle 10 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	1000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.85	
4	FRPRIME-UL PRODUCT	3.86	BTU/HR-F-FT2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	5.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	9.69	0.00	194.23	841.	37.
FEB	0.0	17.09	0.00	175.43	675.	40.
MAR	0.0	30.52	0.00	194.23	600.	42.
APR	3.8	45.70	0.00	187.96	300.	47.
MAY	9.4	58.00	0.00	194.23	344.	53.
JUN	12.2	60.94	0.00	187.96	194.	58.
JUL	13.0	63.24	0.00	194.23	118.	62.
AUG	8.9	53.23	0.00	194.23	117.	61.
SEP	3.5	40.09	0.00	187.96	220.	57.
OCT	0.0	21.76	0.00	194.23	445.	50.
NOV	0.0	12.70	0.00	187.96	635.	43.
DEC	0.0	8.11	0.00	194.23	769.	40.
ANN	4.3	421.06	0.00	2206.91	5537.	

Plastic swimming pool collector, tilt angle 5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	2000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT (NORMAL INCIDENCE)	.85	
4	FRPRIME-UL PRODUCT	3.86	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	5.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	19.37	0.00	194.23	841.	37.
FEB	0.0	34.18	0.00	175.43	675.	48.
MAR	0.0	61.85	0.00	194.23	600.	42.
APR	8.1	91.40	0.00	187.96	500.	47.
MAY	17.9	116.01	0.00	194.23	344.	53.
JUN	23.0	121.88	0.00	187.96	194.	58.
JUL	24.4	126.48	0.00	194.23	118.	62.
AUG	17.1	106.46	0.00	194.23	117.	61.
SEP	7.3	81.77	0.00	187.96	220.	57.
OCT	0.0	43.52	0.00	194.23	445.	50.
NOV	0.0	25.48	0.00	187.96	635.	43.
DEC	0.0	16.21	0.00	194.23	769.	40.
ANN	8.2	843.72	0.00	2286.91	5537.	

Plastic swimming pool collector, tilt angle 5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	3000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.85	
4	FRPRIME-UL PRODUCT	3.86	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	5.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	29.86	0.00	194.23	841.	37.
FEB	0.0	51.28	0.00	175.43	675.	40.
MAR	0.0	91.57	0.00	194.23	600.	42.
APR	13.0	137.10	0.00	187.96	500.	47.
MAY	25.9	174.01	0.00	194.23	344.	53.
JUN	32.5	182.01	0.00	187.96	194.	58.
JUL	34.2	189.71	0.00	194.23	110.	62.
AUG	24.6	159.69	0.00	194.23	117.	61.
SEP	11.4	122.66	0.00	187.96	220.	57.
OCT	0.0	65.28	0.00	194.23	445.	50.
NOV	0.0	38.09	0.00	187.96	635.	43.
DEC	0.0	24.32	0.00	194.23	769.	40.
ANN	11.9	1265.50	0.00	2286.91	5537.	

Plastic swimming pool collector, tilt angle 5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	4000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.85	
4	FRPRIME-UL PRODUCT	3.86	BTU/H-F-FT2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	5.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CNIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	38.75	0.00	194.23	841.	37.
FEB	0.0	68.37	0.00	175.43	675.	40.
MAR	0.0	122.09	0.00	194.23	600.	42.
APR	18.4	182.80	0.00	187.96	388.	47.
MAY	33.5	232.82	0.00	194.23	344.	53.
JUN	40.9	243.75	0.00	187.96	194.	58.
JUL	42.9	252.95	0.00	194.23	118.	62.
AUG	31.7	212.92	0.00	194.23	117.	61.
SEP	16.0	163.55	0.00	187.96	220.	57.
OCT	0.0	87.04	0.00	194.23	445.	50.
NOV	0.0	50.79	0.00	187.96	625.	43.
DEC	0.0	32.42	0.00	194.23	769.	40.
ANN	15.4	1687.45	0.00	2286.91	5537.	

Plastic swimming pool collector, tilt angle 5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	6000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.85	
4	FRPRIME-UL PRODUCT	3.86	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	5.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	58.12	0.00	194.23	841.	37.
FEB	0.0	182.55	0.00	175.43	675.	40.
MAR	3.0	183.14	0.00	194.23	688.	42.
APR	31.7	274.20	0.00	187.96	588.	47.
MAY	47.9	348.03	0.00	194.23	344.	53.
JUN	55.5	365.63	0.00	187.96	194.	58.
JUL	57.3	379.43	0.00	194.23	118.	62.
AUG	44.9	319.38	0.00	194.23	117.	61.
SEP	26.7	245.32	0.00	187.96	228.	57.
OCT	0.0	138.55	0.00	194.23	445.	50.
NOV	0.0	76.19	0.00	187.96	635.	43.
DEC	0.0	48.63	0.00	194.23	769.	40.
ANN	22.4	2531.17	0.00	2286.91	5537.	

Plastic swimming pool collector, tilt angle 5 degrees.

CODE	VARIABLE DESCRIPTION	VALUE	UNITS
1	AIR SYSTEM=1, LIQUID SYSTEM=2	2.00	
2	COLLECTOR AREA	5000.00	FT2
3	FRPRIME-TAU-ALPHA PRODUCT(NORMAL INCIDENCE)	.85	
4	FRPRIME-UL PRODUCT	3.86	BTU/H-F-F2
5	NUMBER OF TRANSPARENT COVERS	1.00	
6	COLLECTOR SLOPE	5.00	DEGREES
7	AZIMUTH ANGLE (E.G. SOUTH=0, WEST=90)	.00	DEGREES
8	STORAGE CAPACITY	15.00	BTU/F-FT2
9	EFFECTIVE BUILDING UA	0.00	BTU/HR-F
10	CONSTANT DAILY BLDG HEAT GENERATION	0.00	BTU/DAY
11	(EPSILON)(CMIN)/(EFFECTIVE BUILDING UA)	.50	
12	HOT WATER USAGE	10000.00	GAL/DAY
13	WATER SET TEMPERATURE	125.00	F
14	WATER MAIN TEMPERATURE	50.00	F
15	CITY CALL NUMBER	89.00	
16	THERMAL PRINT OUT BY MONTH=1, BY YEAR=2	1.00	
17	ECONOMIC ANALYSIS ? YES=1, NO=2	2.00	

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****THERMAL ANALYSIS****

TIME	PERCENT SOLAR	INCIDENT SOLAR (MMBTU)	HEATING LOAD (MMBTU)	WATER LOAD (MMBTU)	DEGREE DAYS (F-DAY)	AMBIENT TEMP (F)
JAN	0.0	48.43	0.00	194.23	841.	37.
FEB	0.0	85.46	0.00	175.43	675.	40.
MAR	0.0	152.62	0.00	194.23	600.	42.
APR	24.7	228.58	0.00	187.96	500.	47.
MAY	40.8	298.82	0.00	194.23	344.	53.
JUN	48.5	384.69	0.00	187.96	194.	58.
JUL	50.5	316.19	0.00	194.23	110.	62.
AUG	38.4	266.15	0.00	194.23	117.	61.
SEP	21.1	204.43	0.00	187.96	220.	57.
OCT	0.0	100.00	0.00	194.23	445.	50.
NOV	0.0	63.49	0.00	187.96	635.	43.
DEC	0.0	40.53	0.00	194.23	769.	40.
ANN	18.0	2189.31	0.00	2286.91	5537.	

Plastic swimming pool collector, tilt angle 5 degrees.